

REMARKS

This Amendment responds to the Office Action dated September 20, 2005 in which the Examiner objected to the drawings, abstract and claims 1-2 and 7-13, rejected claim 13 under 35 U.S.C. §102(b) and rejected claims 1-12 under 35 U.S.C. §103.

Attached to this Amendment is a replacement sheet for Figure 2 in order to delete the reference numeral X₀. Applicant respectfully requests the Examiner approves the correction and withdraws the objection to the drawings.

As indicated above, a new abstract has been provided. Therefore, Applicant respectfully requests the Examiner approves the new abstract and withdraws the objection thereto.

As indicated above, minor informalities in claims 1-2 and 7-13 have been corrected. Therefore, Applicant respectfully requests the Examiner withdraws the objection to claims 1-2 and 7-13.

As indicated above, claim 13 has been amended in order to make explicit what is implicit in the claim. The amendment is unrelated to a statutory requirement for patentability and does not narrow the literal scope of the claim.

Claim 1 claims an apparatus for X-ray analysis comprising a focusing optical system, shifting means, moving means and a mask. The focusing optical system is formed by arranging an X-ray source adapted to generate X-rays, specimen supporting means for supporting a specimen and two-dimensional X-ray detecting means for detecting X-rays from the specimen so as to satisfy requirements of the focusing optical system. The shifting means is for shifting an angle of incidence of X-rays relative to the specimen by rotating the specimen or the X-ray source around

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a central axis of rotation passing through a surface of the specimen. The moving means is for moving the two-dimensional X-ray detecting means in parallel with the central axis of rotation. The mask is arranged at a position in front of the two-dimensional X-ray detecting means as viewed from the specimen and has a slit on a line intersecting a plane rectangularly intersecting the central axis of rotation and containing a central optical axis of incident X-rays.

Through the structure of the claimed invention having a) a two-dimensional X-ray detecting means, b) a means for moving the two-dimensional X-ray detecting means in parallel with a central axis of rotation and c) a mask having a slit on a line intersecting a place rectangularly intersecting the central axis of rotation as claimed in claim 1, the claimed invention provides an apparatus for an X-ray analysis for both a focusing method and a parallel beam method. The prior art does not show, teach or suggest the invention as claimed in claim 1.

Claim 13 claims a method for X-ray analysis in which X-rays are emitted from an X-ray source to strike a specimen in a form of either a divergent beam or a parallel beam, and X-rays which emerges from the specimen are detected by a two-dimensional X-ray detecting means. The method has a measuring step using the divergent beam. The measuring step comprises the steps of causing X-rays emitted from an X-ray source to strike a specimen in a form of either a divergent beam or a parallel beam. When using a divergent beam, the method further comprising steps of shifting an angle of incidence of X-rays striking the specimen by rotating either the specimen or the X-ray source around a central axis of rotation running through a surface of the specimen, arranging a mask having a slit in front of the two-dimensional X-ray detecting means so as to make the slit to be located on a line

intersecting a plane rectangularly intersecting the central axis of rotation and containing a central optical axis of incident X-rays and moving the two-dimensional X-ray detecting means in parallel with the central axis of rotation in synchronism with the shift of the angle of incidence of X-rays relative to the specimen.

Through the method of the claimed invention having a two-dimensional X-ray detecting means as claimed in claim 13, the claimed invention provides a method in which both a parallel beam and focusing method can be used. The prior art does not show, teach or suggest the method as claimed in claim 13.

Claim 13 was rejected under 35 U.S.C. §102(b) as being anticipated by *Iwasaki et al.* (JP 09-229879).

Applicant respectfully traverses the Examiner's rejection of claim 13 under 35 U.S.C. §102(b). The claim has been reviewed in light of the Office Action and for reasons which are set forth below, Applicant respectfully requests the Examiner withdraws the rejection to the claim and allows the claim to issue.

Iwasaki et al. appears to disclose an X-ray apparatus which can perform both a focusing X-ray measurement and a parallel beam X-ray measurement without changing arranging positions of an X-ray optical element. A three-slit optical system 11 has three slits 5, 6, 7 arranged between an X-ray source F and a sample S. The sample S and X-ray detector 2 are loaded on a goniometer 4. Distance R1 between the X-ray source and the sample is set to be equal to the distance R2 between the sample and a fifth slit 21. A parallel beam X-ray measurement is achieved with the use of the three-slit optical system 11. If the first slit 5 is open and the second slit 6 is used as a divergent regulation slit, a focusing X-ray measurement is enabled.

Thus, *Iwasaki et al.* merely discloses arranging a slit 21 in front of an X-ray detecting device 2, which is a zero-dimensional X-ray detecting means. In other words, nothing in *Iwasaki et al.* shows, teaches or suggests a two-dimensional X-ray detecting means as claimed in claim 13. Rather, *Iwasaki et al.* teaches away from the claims invention and merely discloses a zero-dimensional X-ray detecting means.

Since nothing in *Iwasaki et al.* shows, teaches or suggests a two-dimensional X-ray detecting means detecting as claimed in claim 1, Applicant respectfully requests the Examiner withdraws the rejection to claim 13 under 35 U.S.C. §102(b).

Claims 1-2, 4-5, 7-8 and 10-11 were rejected under 35 U.S.C. §103 as being unpatentable over *Doshiyou* (JP 04161843) in view of *Dosho* (U.S. Patent No. 6,285,736).

Applicant respectfully traverses the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for reasons which will be set forth below, Applicant respectfully requests the Examiner withdraws the rejection to the claims and allows the claims to issue.

Doshiyou appears to disclose obtaining many Debye rings for the length of cathode rays at the same time by intermittently rotating a sample in the direction of the length of the cathode rays in a position-sensitive-type X-ray detector, and intensity of the X-rays from the sample. The X-rays are emitted from an X-ray source 2 on a sample 3. The diffracted X-rays are received in the inside of an outer tube 9 through a slit 7 of a position-sensitive-type X-ray detector 6. Gas molecules ionized by the X-rays which are cast into the outer tube. The ions accelerated with wire electrodes 10 and 11 and reach the vicinity of an anode 21. The positive

voltages which are generated at cathodes 14a, 14b, 14n are input into an operating device 15. At this time, the sample 3 is rotated in the direction of an arrow C b a minute step angle with a sample rotating and driving means 5. In this way, many Debye rings along the broad range of the samples can be obtained at the same time, and the state of the crystal and the like can be judged in excellent accuracy.

Thus, *Doshiyou* merely discloses in Figure 6 a detecting means 19 which moves in a direction perpendicular to the central axis of rotation. However, as claimed in claim 1, the moving means moves the two-dimensional X-ray detecting means in parallel with the central axis of rotation. However, *Doshiyou* teaches away from the claimed invention since the detecting means 19 moves in a direction perpendicular to the central axis of rotation.

Additionally, *Doshiyou* discloses a slit 7 positioned on a line intersecting a plane containing a central axis of rotation passing through a surface of the specimen 3. However, as claimed in claim 1, the slit of the mask is on a line intersecting a plane rectangularly intersecting the central axis of rotation. However, *Doshiyou* teaches away from the claimed invention since the slit 7 is positioned on a line intersecting a plane containing a central axis of rotation passing through a surface of the specimen.

Also, *Doshiyou* discloses a focusing system. However, the focusing system of *Doshiyou* does not include a specimen supporting means for supporting a specimen as claimed in claim 1. Rather, the focusing optical system of *Doshiyou* is similar to the system 14 shown in Figure 2 of the present application.

Finally, nothing in *Doshiyou* shows, teaches or suggests a means for shifting an angle of incidence of X-rays relative to the specimen by rotating the specimen or

the X-ray source around a central axis of rotation passing through a surface of the specimen.

Dosho appears to disclose a method for X-ray micro-diffraction measurement in which diffracted X-rays occurred at a minute portion of a specimen upon irradiating the minute portion with X-rays. (Col. 1, lines 7-10). FIG. 1 is a partially cut away, perspective view of an embodiment of an X-ray micro-diffraction apparatus for detecting X-ray diffraction of a minute sample portion of a specimen, according to the present invention. The X-ray micro-diffraction apparatus comprises an X-ray focal point 'F' as an X-ray source for emitting X-rays, a monochromator 3 for making X-rays emitted from the X-ray focal point 'F' monochromatic, a collimator 4 for deriving the monochromatic X-rays as a parallel X-ray beam having a minute cross sectional diameter, a specimen support member 1 for supporting a specimen 'S', and a stimulation type fluorescent member 2 as a two-dimensional X-ray detector, which has a cylindrical shape surrounding the specimen 'S'. (Col. 6, lines 50-62). The specimen support member 1 includes a ϕ rotary mechanism 6 for rotating the specimen 'S' about an ϕ axis so as to rotate the specimen 'S' in a plane, a swing mechanism 7 for swinging the specimen 'S' about a center 'X' thereof by a limited angle and an ω rotary mechanism 8 for rotating the specimen 'S' about an ω axis. In this embodiment, the swing mechanism 7 is mounted on the ω rotary mechanism 8 and the ϕ rotary mechanism 6 is mounted on the swing mechanism 7. (Col. 7, lines 5-13)

Thus, *Dosho* merely discloses a fluorescent member 2 as a two-dimensional X-ray detector. However, nothing in *Dosho* shows, teaches or suggests a means for moving the two-dimensional X-ray detecting means in parallel with a central axis of

rotation as claimed in claim 1. Additionally, nothing in *Dosho* shows, teaches or suggests a mask arranged at a position in front of the two-dimensional X-ray detecting means and having a slit on a line intersecting a plane rectangularly intersecting the central axis of rotation as claimed in claim 1. Rather, nothing in *Dosho* shows, teaches or suggests a mask having a slit arranged as claimed.

Finally, *Dosho* merely discloses an X-ray source F, a monochromator 3, and a collimator 4. Nothing in *Dosho* shows, teaches or suggests a focusing optical system including a specimen support means for supporting a specimen, X-ray source and two-dimensional X-ray detecting means arranged to satisfy requirements of the focusing optical system as claimed in claim 1.

Since nothing in *Doshiyou* and *Dosho* show, teach or suggest the primary features as claimed in claim 1 as discussed above, Applicant respectfully requests the Examiner withdraws the rejection to claim 1 under 35 U.S.C. §103.

Claims 2, 4-5, 7-8 and 10-11 depend from claim 1 and recite additional features. Applicant respectfully submits that claims 2, 4-5, 7-8 and 10-11 would not have been obvious within the meaning of 35 U.S.C. §103 over *Doshiyou* and *Dosho* at least for the reasons as set forth above. Therefore, Applicant respectfully requests the Examiner withdraws the rejection to claims 2, 4-5, 7-8 and 10-11 under 35 U.S.C. §103.

Claims 3, 6, 9 and 12 were rejected under 35 U.S.C. §103 as being unpatentable over *Doshiyou* and *Dosho* and further in view of *Hirose* (GB 2270230).

Applicant respectfully traverses the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for

reasons which will be set forth below, Applicant respectfully requests the Examiner withdraws the rejection to the claims and allows the claims to issue.

As discussed above, since nothing in *Doshiyou* and *Dosho* show, teach or suggest the primary features as claimed in claim 1, Applicant respectfully submits that the combination of the primary reference with the secondary reference to *Hirose* will not overcome the deficiencies of the primary references. Therefore, Applicant respectfully requests the Examiner withdraws the rejection to claims 3, 6, 9 and 12 under 35 U.S.C. §103.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is requested to contact, by telephone, the Applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicant respectfully petitions for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge
our Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL PC

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AMENDMENTS TO THE DRAWINGS:

Attached please find a replacement sheet for Figure 2.